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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/705,820	11/13/2003	Roy Payne	JHN-839-1521	7850

30024 7590 03/22/2007  
NIXON & VANDERHYE P.C.  
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ARLINGTON, VA 22203

EXAMINER
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JOHNSON, EDWARD M

ART UNIT	PAPER NUMBER
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1754

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/705,820

Applicant(s)

PAYNE ET AL.

Examiner

Edward M. Johnson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 25-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of claims 1-24 in the reply filed on 12/29/06 is acknowledged.

***Specification***

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because it exceeds 150 words. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 5, 10-11, and 15 are rejected under 35

U.S.C. 102(b) as being anticipated by Widmer et al. US

6,474,271.

Regarding claim 1, Widmer '271 discloses a method for decreasing nitrogen oxides from a combustion system comprising:

- a. forming a combustion flue gas in a combustion system (column 1, lines 13-19);
- b. providing overfire air and droplets of reducing agent into the combustion system (abstract and column 3, lines 29-35), wherein the droplets are small (see column 6, lines 54-65);
- c. mixing the overfire air and reducing agent with the combustion flue gas in the combustion system (abstract and column 3, lines 23-34) and heating to above an optimal temperature range (Fig. 1);
- d. heating to a temperature of over 1600 (Fig. 1); and
- e. continuing to increase the temperature (Fig. 1).

Regarding claims 5 and 10, Widmer discloses heating to over 2000 and an optimal temperature of about 1600 degrees Fahrenheit (Fig. 1).

Regarding claims 11 and 15, Widmer discloses spraying aqueous droplets (see column 3, lines 22-25) and providing

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overfire air and droplets of reducing agent into the combustion system (abstract and column 3, lines 29-35).

*Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 2-4, 6-9, 12-14, and 16-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Widmer '271.

Regarding claim 19, Widmer '271 discloses a method for decreasing nitrogen oxides from a combustion system comprising:

- a. forming a combustion flue gas in a combustion system (column 1, lines 13-19);
- b. providing overfire air and droplets of reducing agent into the combustion system (abstract and column 3, lines 29-35), wherein the droplets are small (see column 6, lines 54-65);
- c. mixing the overfire air and reducing agent with the combustion flue gas in the combustion system (abstract and column 3, lines 23-34) and heating to above an optimal temperature range (Fig. 1);
- d. heating to a temperature of over

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1600 (Fig. 1); and e. continuing to increase the temperature (Fig. 1).

Widmer fails to specifically disclose an average droplet size of less than 50 microns.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the stoichiometric ratio and the average droplet diameter to 50-60 microns through routine experimentation because Widmer discloses controlling the amount of fluid and flow rate delivered (column 5, lines 21-29) and formation of fluid droplets is represented by the Raleigh-Weber equation (columns 3-4) and a fraction of drops are below 100 microns (column 6, lines 63-64).

Regarding claim 2, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the optimal temperature range occur in less than 0.3 seconds because Widmer '271 discloses continuous temperature increase on a graph and a single point where NO% is lowest, which would suggest, to an ordinary artisan, only an instant of when that exact temperature is achieved.

Regarding claims 3-4, 12-14, 16, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the stoichiometric ratio and the average droplet diameter to 50-60 microns through routine

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experimentation because Widmer discloses controlling the amount of fluid and flow rate delivered (column 5, lines 21-29) and formation of fluid droplets is represented by the Raleigh-Weber equation (columns 3-4) and a fraction of drops are below 100 microns (column 6, lines 63-64).

Regarding claims 6-9, 17-18, 21-22, and 24, it would have been obvious to inject the reducing agent and overfire air concurrently or mixed in the center and/or upper portion beforehand because Widmer discloses providing overfire air and droplets reducing agent into the combustion system (abstract and column 3, lines 29-35), wherein the droplets are small (see column 6, lines 54-65), mixing the overfire air and reducing agent with the combustion flue gas in the combustion system (abstract and column 3, lines 23-34); and injection in a center upper portion with respect to the injection (Fig. 2).

Regarding claim 20, Widmer '271 discloses ammonia, urea, cyanuric acide, or other compounds (see column 1, lines 63-67).

Regarding claim 23, Widmer discloses heating to over 2000 and an optimal temperature of about 1600 degrees Fahrenheit (Fig. 1).

#### **Conclusion**

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Breen et al. US

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6,258,336 discloses a method and apparatus for NO<sub>x</sub> reduction in flue gases comprising injection of hydrocarbon, reducing agent, and oxygen into a combustion zone (see abstract and detailed description); Zauderer US 6,048,510 discloses a method for reducing nitrogen oxides in combustion effluent comprising reaction with urea or ammonia by injection of air atomized droplets (see abstract and Examples).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward M. Johnson whose telephone number is 571-272-1352. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system,



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see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Edward M. Johnson  
Primary Examiner  
Art Unit 1754

EMJ